Issued July 16, 1913.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS—MILTON WHITNEY, Chief.

SOIL SURVEY OF FAIRFIELD COUNTY SOUTH CAROLINA.

BY

M. EARL CARR, F. S. WELSH, G. A. CRABB,
RISDEN T. ALLEN, AND W. C. BYERS.

HUGH H. BENNETT, INSPECTOR IN CHARGE SOUTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1911.]

WASHINGTON
GOVERNMENT PRINTING OFFICE
1913

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., November 27, 1912.

SIR: During the field season of 1911 a soil survey was made of Fairfield County, S. C., for the purpose of securing such information relative to the individual characteristics of the soils and their crop adaptabilities as would lead to a further development of the agricultural resources of the county.

I have the honor to transmit herewith the manuscript report and map covering this work, and to request their publication as advance sheets of Field Operations of the Bureau of Soils for 1911, as authorized by law.

Very respectfully,

MILTON WHITNEY,
Chief of Bureau.

Hon. JAMES WILSON,
Secretary of Agriculture.

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SOIL SURVEY OF FAIRFIELD COUNTY, SOUTH CAROLINA.

By M. EARL CARR, F. S. WELSH, G. A. CRABB, RISDEN T. ALLEN, and W. C. BYERS.

DESCRIPTION OF THE AREA.

Fairfield County lies in the north-central part of South Carolina. It is directly north of Savannah, Ga., and Columbia, the State capital. It is bounded on the north by Chester County, on the east by the

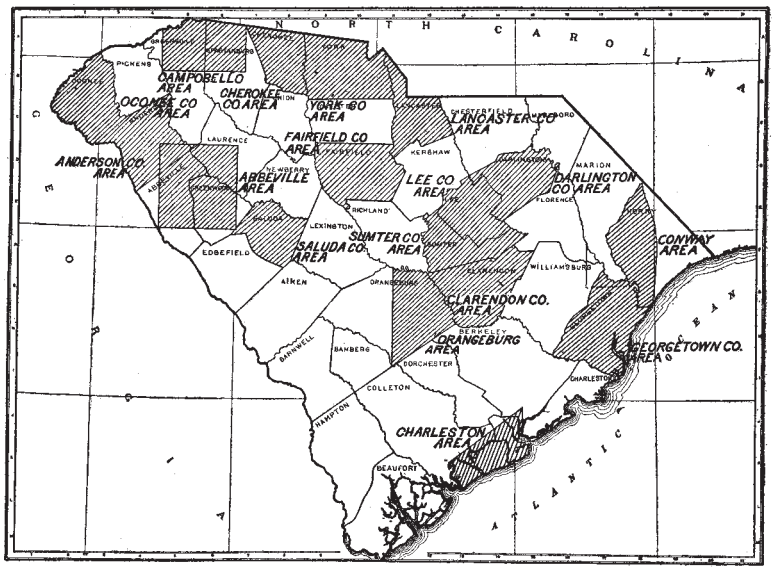


FIG. 1.—Sketch map showing areas surveyed in South Carolina.

Catawba-Wateree River, which separates it from Lancaster and Kershaw Counties, on the south by Richland County, and on the west by the Broad River, which divides it from Union, Newberry, and Lexington Counties. Little River, the principal interior stream of the county, also forms the eastern boundary of a southern projection for a short distance above its confluence with the Broad River, here separating Fairfield County from Richland County. The county has an area of 756 square miles, or 483,840 acres, representing $2\frac{1}{2}$ per cent of the total area of the State.

Fairfield County is located in the "up country" or Piedmont Plateau region of the State, in contradistinction to the "low country" or Coastal Plain section, though a small part of it lies in the Sand Hill division of the latter section.

Taken as a whole the county is very hilly, though the range in elevation between the lowest and highest points is little more than 400 feet. The lowest elevation in the county is at the junction of Broad and Little Rivers, the most southerly point of the county, slightly less than 200 feet above sea level. One of the highest points is at Ridgeway, about 625 feet above sea level. The range in elevation in any one locality is usually only from 100 to 200 feet. However, in spite of this small difference, the surface in many places is extremely rough and uneven. The crests of the ridges in any one locality, where an undulating topography is found, do not vary greatly in elevation from one another, though there is some difference in the different sections of the county. They are usually from 300 feet to 600 feet above mean tide level.

These ridges are the remnants of a former extensive undulating plateau. The region has been subjected to severe erosion and is dissected by a large number of streams, both large and small, giving it a generally rough topography. One of these ridge crests extends across the county in a northwesterly and southeasterly direction, being the watershed between the Broad River on the west and the Catawba-Wateree River on the east. The Southern Railway and a public highway follow it through the county without crossing a stream in the entire distance. The crests of the ridges often broaden out into undulating interstream areas where erosion and dissection have not proceeded to any great extent. It is in such places that the best plantations are usually found.

While the main ridges have a general northwest-southeast trend, the direction of the main drainage systems, the minor ridges have no general direction, but depend upon the direction of the small drainage channels. Although the tops of these ridges are only undulating to moderately rolling, their sides are steep and rough, being much gullied and cut by erosion.

In the southeastern corner of the county, adjoining Richland and Kershaw Counties, is a region of comparatively limited extent whose topography and soils have characteristics of both Piedmont Plateau and Coastal Plain types. Some small areas here have the level surface of the "low country" and others the rolling to hilly surface of the "up country." However, in this region, where the lighter and looser coastal soil materials cover the surface, the rough, gullied topography prevailing over the remainder of the county is almost wanting.

Along the stream courses are rather narrow belts of smooth topography varying in elevation from about 200 feet to 400 feet above sea level. Their elevation above the streams themselves is nearly always slight and they are consequently subject to inundation in times of high water.

Fairfield County is drained by the Santee River system, the largest in the State. The Broad River forms the entire western and southwestern boundary of the county. This stream farther down helps to form the Congaree River, which in turn joins the Santee. The Catawba-Wateree River, which forms a portion of the boundary of the county, is also a tributary of the Santee River.

All the drainage of that portion of the county lying west of the main line of the Southern Railway or west of the ridge previously mentioned, belongs in the Broad-Congaree-Santee system, while all that portion lying east of the same line of railroad and ridge belongs to the Catawba-Wateree-Santee system. Little River is the principal interior stream of the county. It has its source in a number of forks west of Woodward and flows in a southerly direction to the Broad River, forming the county boundary for a short distance above its mouth. Its principal tributaries are McMeekin Branch, Crumpton and Opossum Creeks from the west, and Morris, Mill, Jackson, and Dumpers Creeks from the east. The western part of the area drains into the Broad River through a number of small streams, the largest of which are Frees, Terrible, Rocky, and Beaver Creeks.

The largest stream of the eastern side of the county is Wateree Creek. About 3 miles above its mouth Wateree Creek branches into Big and Little Wateree Creeks. The former extends in a westerly direction, having its source just east of Woodward, and the latter in a south and west direction, heading near Simpson. The Big Wateree Creek has but two tributaries of any size, Gaydens Creek from the south and Hog Fork from the north. The Little Wateree Creek receives Horse Branch from the south and Johnson, Readys, and McCulley Creeks from the west for tributaries. Another stream of considerable size in this part of the county is Dutchmans Creek. Other streams emptying directly into the Catawba-Wateree River are Crooked, Taylors, Rochelle, and Colonel Creeks.

In the southern part of the county Little Cedar and Big Cedar Creeks drain a considerable area. They are tributary to the Broad River. In the southeastern corner of the county are Thorntree, Sawneys, Bear, and Twenty-Five Mile Creeks, whose waters eventually reach the Wateree River through Kershaw County.

The first permanent settlement in the county was at the mouth of Beaver Creek, on Broad River, in 1745. About the same time a family settled in the opposite side of the county near Bucklick, on the Wateree River.

This whole country was Cherokee Indian territory and remained in the possession of that tribe until ceded by them under treaty in 1755. Immediately afterwards and until the Revolutionary War many Scotch-Irish settlers came in from Pennsylvania and other regions to the north. These were met here by the Germans and Huguenots

pushing out toward the interior from the older settlements of the coast and low country.

Little progress was made in settlement during the Revolutionary War. Much fighting took place over the territory now comprised within the county limits. Winnsboro, the county seat, was for some time the headquarters of Lord Cornwallis, the British commander. Fairfield County at that time formed part of the Camden district, but it was established as a separate county in 1798.

The present population, according to the census of 1910, is 29,442. It consists very largely of the descendants of the early settlers and the descendants of former slaves. The negroes outnumber the whites about 3 to 1.

Winnsboro is the largest town of the area and the county seat. Its population, according to the census of 1910, is 2,667. Adjacent to Winnsboro, and virtually a portion of it, is a mill village with a population of about 500. Here is located the Fairfield Cotton Mill, with 25,000 spindles. This and the cottonseed oil mill in Winnsboro constitute the manufacturing industries of the county. Ridgeway, the second village in size, has a population of 370. It is located in the highest part of the county. Blackstock, with a population of about 200, lies partly in Fairfield and partly in Chester County. All these villages are situated on the railroad. Other small villages are scattered about the county, chief of which is Rion, a settlement of quarry workers southwest of Winnsboro.

Transportation facilities in the county are inadequate. Many sections are remote from shipping points and connected with them by poor wagon roads. There is no competition in outside transportation, the Southern Railway offering the only outlet to markets. It furnishes good service, both passenger and freight, and gives direct connection with Columbia, the largest near-by city, with the ports of Charleston and Savannah to the south, and with the large markets of the North Atlantic seaboard.

Although there is an abundance of material at hand in all sections of the county for the building of improved sand-clay roads, the county roads are for the most part only fair to poor. A model section of such an improved road was built some years ago, but scarcely any care has been given it since. Actual road building is by county convict labor. Many of the roads are in places badly gullied and washed and practically impassable. A fairly extensive system of improved roads reaching all parts of the county, such as could be constructed at a cost not prohibitive, would result in saving to the planters, in the cost of hauling cotton and fertilizers alone, an amount which would in a few years more than repay the whole cost of the work.

Markets for products of the county are good. Much of the supplies now imported into the county could be raised at home, and with a little thought and extra labor other lines of agriculture besides cotton growing could be made profitable. At present the forage and grain grown in the county are inadequate to supply the work stock used in the cultivation of cotton, making heavy importations necessary.

CLIMATE.

The climate of Fairfield County is marked by a rather narrow range in the mean temperature of the different seasons of the year, which are 44°, 62°, 79°, and 63° F. for the winter, spring, summer, and fall, respectively. The average rainfall is ample, though not excessive, and snow is a rarity.

The summers are long and hot, while the winters are short and mild. The hot summer weather lasts for five months, from May to September, inclusive. The mean temperature for these five months is 78° F. Temperatures of 100° F. are occasionally reached, 104° F. being the absolute maximum. The mild winter weather lasts from December through February and perhaps early March. During this period of the year the mean temperature is around 44° F., though on some days it exceeds 75° F. Very low temperatures are seldom attained, though a minimum of —3° F. has been recorded in the past 15 years. The extreme range in temperature during this period is 107° F. The two spring months, March and April, and the two fall months, October and November, are a combination of both the winter and summer months in regard to temperature, there being occasional frosts, as well as some especially hot days, though as a whole they are mild and equable, their mean temperature being about that for the whole year, around 60° F.

The normal annual precipitation amounts to 44.3 inches, 32.7 inches being recorded during the year of minimum precipitation and 52.5 inches as the maximum. June, July, and August are the months of the greatest rainfall, as well as the hottest. During these three months the precipitation amounts to 15.7 inches. The period of least precipitation occurs during the cotton-picking season of autumn and early winter, being only about one-half that of the growing season. The rainfall is usually fairly well distributed, although periods of excess and occasionally of deficiency are experienced.

The following table, compiled from the records of the Weather Bureau, gives the normal monthly, seasonal, and annual temperature and precipitation; also the maximum and minimum temperatures for each month and the precipitation for each month of the driest and wettest calendar years at Winnsboro. These records cover a

period of 15 years, beginning March, 1896, and ending with February 28, 1911, and represent weather conditions prevailing over the entire county.

Normal monthly, seasonal, and annual temperature and precipitation at Winnsboro, S. C.

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.	Snow, average depth.
	°F.	°F.	°F.	Inches.	Inches.	Inches.	Inches.
December	44	80	12	3.4	3.7	6.1	0.1
January	43	78	9	2.9	2.9	1.7	0.6
February	44	77	−3	4.3	3.3	4.6	2.0
Winter	44			10.6	9.9	12.4	2.7
March	55	92	16	3.7	2.1	2.0	0.1
April	60	94	27	3.2	2.0	2.4	0
May	71	100	40	3.2	3.1	6.6	0
Spring	62			10.1	7.2	11.0	0.1
June	77	100	51	5.1	1.0	5.7	0
July	80	104	55	4.8	4.9	7.6	0
August	79	102	55	5.8	5.0	4.6	0
Summer	79			15.7	10.9	17.9	0
September	74	97	41	2.6	0.8	8.0	0
October	63	90	30	3.1	0.9	0.5	0
November	53	83	20	2.2	3.0	2.7	T.
Fall	63			7.9	4.7	11.2	T.
Year	61	104	−3	44.3	32.7	52.5	2.8

The average length of the growing season is 228 days, or over 7 months, the average date of the last killing frost in the spring being April 1, and that of the first in autumn being November 15. The average season may be shortened for the tenderest vegetation by slightly more than one month, as the latest killing frost in spring recorded occurred April 17 and the earliest in fall October 29. It is likely that in the stream bottoms and lowlands killing frosts occur both later in the spring and earlier in the fall than at the station where the above dates have been recorded.

AGRICULTURE.

Agriculture in the county commenced with the advent of the first settlers in 1745, who located upon the rich lands of the creek margins and river bottoms. They raised some stock and cleared and

cultivated the land, growing cereals and vegetables for their own use. As the population increased more land was cleared, and the growing of corn, wheat, and cotton became more extensive. Settlement and agriculture received a great impetus at the close of the Revolutionary War, the products of the area being marketed at Charleston. Later Columbia became the marketing point, whence the products were sent to Charleston for export.

As early as 1824 the agriculture of the county had increased until there were 50,000 acres under cultivation. At that time the estimated value of the crops grown in the county was $750,000, or about one-half the value of the crops grown in 1899, 75 years later. Yields of the three staple crops were then from 700 to 800 pounds of seed cotton, or one-half bale of lint to the acre; 10 to 50 bushels of Indian corn, and 15 bushels of wheat. The cotton and corn yields were about the same as now, and the wheat about twice the present yield. Farm-land values then ranged from $3 to $20 or $30 an acre. These figures represent present values fairly well, except for well-improved plantations and tracts favorably located with reference to towns and shipping facilities.

Stock raising has never been of prime importance, though proportionately much more extensive during the colonial days than in recent years. Cotton early became the leading crop. It has since held this place continuously, and is now more firmly intrenched than ever. Little attention has ever been given to the production of forage crops, or of grain crops other than corn.

The agriculture of the present time thus consists principally of the production of the one money crop, cotton. In 1909 the production of this crop was 25,383 bales of 500 pounds each, or a yield of about one-third bale per acre on 75,627 acres. The area of improved land in farms was 180,949 acres, and of this 41.8 per cent was used for cotton. Corn ranked second, with 33,512 acres. The average yield of this crop is small, being only 17.4 bushels per acre, or a total production for the county of 585,461 bushels. There were 8,484 acres in oats, and the production reached 203,155 bushels, or a little more than 12 bushels per acre. Only 63 acres are reported in wheat, a decided decrease since 1900. The forage crops occupied 4,453 acres and yielded 6,146 tons of hay and roughage.

According to the census of 1910, 397,885 acres, or 78.5 per cent of the area of the county, is in farms. Only 180,949 acres, or 45.5 per cent, is classed as improved. The value of all farm property was $6,361,199. Of this implements and machinery represented $273,767, domestic animals $1,073,675, leaving $5,013,757 as the value of the land and buildings. The value of farm property increased 89.8 per cent during the decade 1900–1910.

The adaptation of soils to crops has not been recognized or at least has not been considered in the farm practice. Cotton and corn are grown on all soils in the county, and when any field fails to give profitable yields of these two staples recourse is had to commercial fertilizers or it is thrown out of cultivation. That other crops as staples have been unknown in the past is shown by the fact that 87 per cent of all tilled land in the county in 1899 was devoted to these two crops. In fact, the proper adaptation of soils to crops is impossible under the prevailing system of agriculture.

The financial condition of most of the planters has been and is such as to demand that a ready-money crop be produced. The majority of the planters are renters, either white or colored, only 26.4 per cent of the farms being operated by the owners in 1910. Practically all of the tenant class of planters operate on a credit basis, the owner of the land or some merchant advancing the necessary supplies and taking a lien on the crop, to be paid when the cotton is sold. Such a system is not conducive to the development of the county. Under the present system cotton is a ready-money crop, and the lien system demands that it be grown. It has been grown so long and so continuously to the exclusion of other staples that the labor scarcely knows how to grow any other crop.

The soils and climatic surroundings are well suited to other crops and forms of farm industry, which could be practiced in conjunction with the production of cotton. The average farmer does not produce enough corn and forage to supply his own wants, to say nothing of a surplus for sale. Many forage crops can be grown with scarcely any trouble, and the region is well suited to stock raising and dairying, which could be carried on profitably in connection with cotton growing. Many of the forage crops are also valuable soil improvers as well. Cowpeas thrive on all of the soils of the county, furnish a quantity of forage rich in protein, and also enrich the soil. In recent years this crop has been grown rather extensively, especially in the cornfields, and a marked improvement in the yield of subsequent crops has been the result. Crimson clover can be grown as a winter cover crop without great difficulty, though not largely used. Vetch and bur clover grow wild all over the county. They also make excellent cover crops, though not used as such to any great extent. All these plants are legumes, and besides furnishing valuable hay or pasturage they extract nitrogen, the most costly ingredient of the commercial fertilizers, from the air.[1]

The whole system of farming has been directed to producing more cotton with little or no regard for other crops, or even for the future cotton crop itself. There is at present a tendency toward

[1] For further discussion of the cultivation of the legumes, see Farmers' Buls. Nos. 318, Cowpeas; 372, Soy Beans; and 278, Leguminous Crops for Green Manuring.

better farming on the part of those who operate their own land, although the tenants farm only for the present crop, taking no thought of the future. Less dependence should be placed on cotton and more attention given to producing at least the necessaries of life, which are now purchased at high prices. Such a system need not curtail the production of cotton. If rightly followed it would improve soils to such an extent that, in addition to these minor crops, a greater production of cotton would be obtained.

Planters do not generally practice a systematic rotation of crops. Under the present system of farming it is difficult to plan a rotation adequate for the needs of the soils. Cotton is grown on many fields year after year, the planter depending upon commercial fertilizer alone for success. Fortunately this crop can be grown year after year on the same field probably as long as any crop suited to the region. Corn is alternated with cotton as much as possible, but with the preponderating acreage in cotton this does not admit of rotation over all fields. Other crops should be introduced in rotation, at least one of them being a legume and one a sod crop for improving the condition of the soil. It is encouraging to note that a great many farmers are growing cowpeas both between the corn rows and alone. The widespread production of this crop is a sure indication of agricultural progress.

Many steep hillsides have been cleared and planted to cotton and corn, and these have become so badly gullied and washed as to prevent tillage. (Plate I, fig. 1.) Such fields are to be found in all sections of the county and are now grown up to old-field pines. Not only these hillside fields, but many of more gentle slope, have been allowed to reach the same condition. (Plate I, fig. 2.) Besides the loss in farm acreage due to the abandonment of these upland areas, much bottom land has been made worthless by a covering of sand washed down from the cleared uplands. It is believed that at present as large an acreage lies idle and abandoned from this cause as is actually under cultivation. The area under cultivation is further curtailed by local erosions within the fields now cultivated. Some effort has been made to save and even to reclaim fields by the introduction of contour cultivation and terracing. (Plate II.) Two methods present themselves for reclaiming and utilizing these washed and gullied areas. In the first place the steeper hillside fields should never have been cleared, and such areas as are now in forest should be protected from fire and handled along modern lines of forestry. Valuable and quickly growing varieties of trees should be set to augment the stand already growing. All such areas could, at a comparatively small expense, be reforested and in the course of a number of years produce an annual cutting of valuable timber, where now without care or attention they are absolutely nonproductive. The second

method is to establish a Bermuda grass sod, which would prevent further washing and gullying. The land could then be used for pasture and would furnish grazing for large numbers of cattle, returning an income from acres now idle.

On the cultivated areas of gentler slopes much can be done to lessen the damage from erosion. Deeper plowing, which enlarges the reservoir for holding moisture, would prevent much of the surface run-off and consequently much of the washing. The incorporation of more organic matter in the soils, through the use of stable manure, the plowing under of cover crops, and the growing of legumes, etc., would retard, if not prevent, erosion. The organic matter content of a soil has a mechanical binding effect on the soil particles and also enables it to absorb and retain more moisture. Such treatment increases the soil's capacity to resist erosion. Lime also has the same effect upon soils of loose texture. Sod crops are even more effective on the gentle slopes than on the steep slopes, and all areas not in cultivation should be grassed. In the cropping system a place should be provided once at least in every few years for a sod crop. The clean culture given to corn and cotton has been and still is the ruination of many fields. This will continue unless active steps are taken to control erosion.

The soils of Fairfield County are in special need of organic matter. The system of cropping has depleted the soil of its former natural store of such material, and the problem now is to aid nature in restoring it. This can be done by the use of stable manure and by growing crops to turn under as green manure. Manure is now used where available, but the supply is entirely inadequate. The practice of green manuring is but little followed. The common custom is to leave the cotton lands bare during the winter months. This should not be so. Rye, oats,[1] barley,[2] or, better yet, vetch or crimson clover should be sown in the cotton fields when the crop is laid by or later. Any of these will make a good growth and form a cover crop to prevent washing. They will also furnish some winter pasturage if needed, and the last two mentioned will enrich the soil with nitrogen. These crops may be turned under in the spring early enough to allow the planting of the summer crops, thus adding much organic matter to the soil. The planting of cowpeas in the corn is another means that may be employed. This being a legume, adds nitrogen to the soil and makes an excellent forage crop of high feeding value, if it is not desired for green manuring. The growing of cowpeas with the corn need not interfere with or prevent the growing of a winter cover crop on the old cornfields, as well as on the cotton fields. No field should be left bare during the winter.

[1] See Farmers' Bul. No. 436, Winter Oats for the South.
[2] See Farmers' Bul. No. 427, Barley Culture in the Southern States.

The depth to which the soil is broken is an important factor in crop production. Cotton and corn are both crops that root deeply wherever possible and should have a deep seed bed. Notwithstanding this, shallow plowing has been the general practice in the county, the majority of planters turning the soil to a depth of only 2 or 3 inches. Where the surface soil is shallow the making of new soil from the raw subsoil should be practiced. This should be done gradually, for if too much of the subsoil be turned up at one time the yield of the crops will be reduced. Probably an inch at any one plowing would not be excessive.

Many areas in the county need drainage, and no other improvement will be at all permanent or of great benefit until this is supplied. Open ditches are in most places all that is necessary, but underdrainage will be found more satisfactory.

All tillage operations should be performed with more care. The entire surface should be plowed rather than "bedded up," leaving much of the field to be prepared later. For corn and cotton the land should be broken deeply with a two-horse turning plow. It should then be harrowed sufficiently to break down all clods and give a mellow tilth. The amount of harrowing will depend upon the character of the soil and the thoroughness and timeliness of the plowing. The seed should be planted on a level seed bed, unless ridging is necessary to improve the drainage. Cultivation should both rid the fields of weeds and conserve the supply of moisture in the soil for the use of the crop. All cultivation should be shallow, especially as the plants grow larger, so that as little injury may be done the feeding roots as possible. It should be frequent enough to maintain a dust mulch on the surface.

Every farmer should seek to improve both the quality and the quantity of his crop by planting only the best seeds and the varieties suited to his different soils and soil conditions. While conditions demand that cotton be the principal crop of the county, it is not necessary that the same variety be planted on all soils. In the study of the adaptation of soils to crops it has been found that a soil is often better adapted to some particular variety than to others. Each farmer should learn through experiment just what varieties of corn, cotton, and other crops are best adapted to his different soils and plant accordingly. When this has been done the next step will be the breeding and selection of seed from these accepted varieties.

An extremely important feature in the agriculture of the county is the use of commercial fertilizer to supplement or to take the place of stable manure. More attention should be given to the kinds and quantities of these materials used. At present fertilizers are used without reference to the kind of crop to be grown or to the differences in soils. Needless expense could be avoided by using the proper mix-

ture in adequate applications. Experiments could be made by each farmer on his soils to ascertain just what elements are needed. At present altogether too much dependence is placed on these commercial manures for producing crops, and in 1899 the expenditure for fertilizers amounted to $72,030, an increase for the preceding 10 years of $10,000, without a corresponding increase in acreage yields. Since that time there has been a considerable increase in the quantity of the commercial fertilizers used. It is believed that the cheap mixtures are not always profitable and that the better grades are in reality cheaper; that is, the ingredients actually cost less per pound in the better mixtures. Heavier acreage applications are recommended than are made by many farmers. There are probably few upland soils in the county that should be given lighter applications, for cotton, than 400 or 500 pounds per acre of good mixtures, and there are some fields that could well be given 800 pounds. Lighter applications will be needed where the soil is well supplied with vegetable matter.

Home mixtures are cheaper in the long run. Excellent mixtures can be made of cottonseed meal, acid phosphate, and kainit. The red granite lands need comparatively little potash. As a rule the deeper the sand the more potash and, within certain limits, the less phosphoric acid is needed. Some of the bottom land soils need phosphoric acid to hasten maturity. Acid phosphate is indicated for any of the staple crops on the cold, late Iredell soils ("black-jack land"). It is certain that potash is effective in preventing rust in cotton and the frenching of corn. Where much raw clay is turned to the surface burnt lime should be applied at the rate of about 1 ton per acre.

The question of keeping more live stock is an important one. Many thousands of acres of land are now lying idle. Some of this affords fair to good grazing of Bermuda grass and Japan clover. This land should be utilized in the grazing of cattle and sheep. Corn can be produced to a much greater extent than at present for feeding purposes. More attention should be given to this type of agriculture, which could be carried on without detracting in the least from the production of cotton.

SOILS.

The soils of Fairfield County may be divided broadly into three groups, the residual soils of the Piedmont Plateau, the sedimentary soils of the Coastal Plain, and the alluvial soils found in both regions. The Piedmont soils are the most important in the county in point of extent and agricultural value. They are derived from the disintegration and weathering of igneous and metamorphic rocks. The parent rocks vary greatly in texture, and the resulting soils range from coarse sandy loams to clay loams.

The residual soils of the county may be subdivided into three general groups according to derivation from granite and gneiss, from the

FIG. 1.—BADLY ERODED FIELD.

[Cultivation will soon have to be abandoned along the lower slope. Land of this kind is valuable only for forestry and pastures (Bermuda grass).]

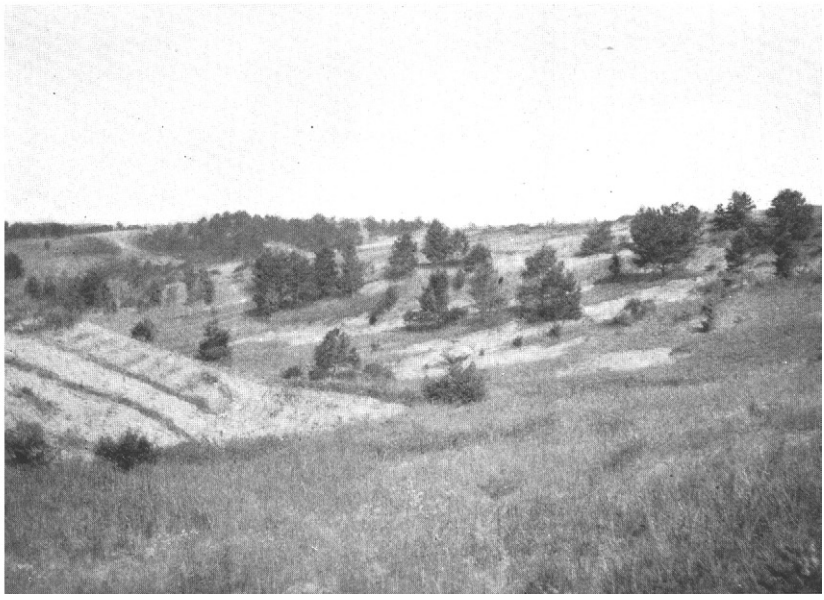
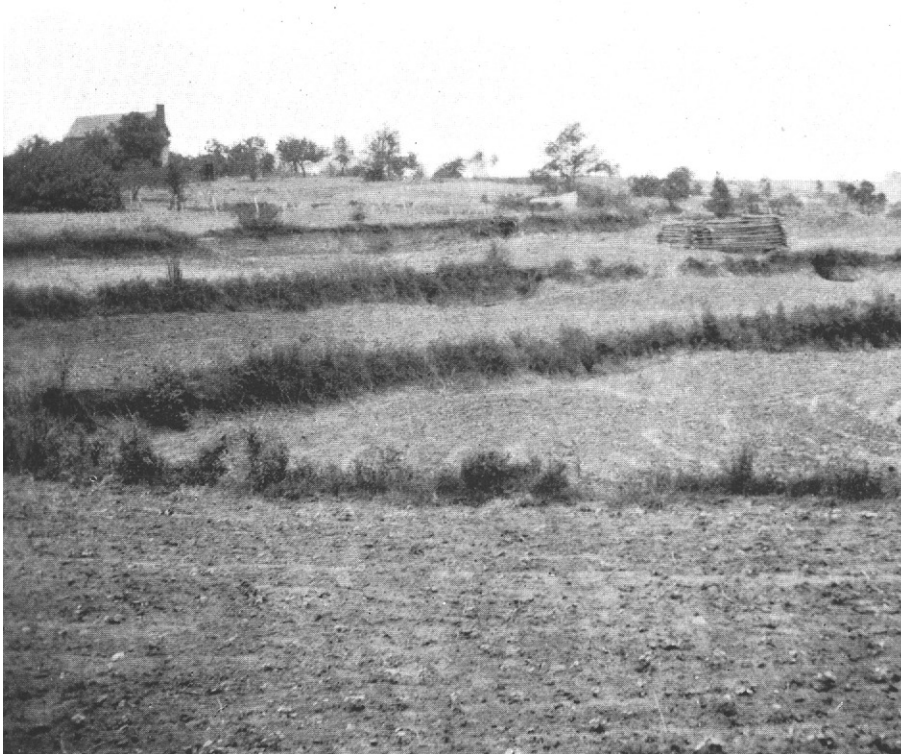


FIG. 2.—EROSION WELL STARTED ON GENTLE SLOPE.

[The volunteer trees on this abandoned slope indicate one means of utilizing such areas and of checking erosion, i. e., reforestation. Bermuda grass thrives on these washed areas, if not too severely gullied, and spreads rapidly when once started, checking erosion, and affording good pasturage.]



TERRACES ON A HILLSIDE TO PREVENT DAMAGE OF FIELDS BY ERO

[These terraces need repair, as the drainage has broken through in plac

altered igneous porphyries, or slates, and from the volcanic dikes of diorite and associated rocks. The soils from granite, with two exceptions, belong in the Cecil series. Six types of this series have been mapped, the Cecil sand, Cecil coarse sandy loam, Cecil sandy loam, Cecil fine sandy loam, Cecil clay loam, and Cecil gravelly loam. In addition there are mapped in this division Rough gullied land (consisting mainly of Iredell, Cecil, and Durham material) and the Appling sandy loam, which differs from the Cecil in having a mottled red and yellow subsoil.

From the slaty rocks, which weather deeply, is derived soil material of silt loam to silty clay loam texture, light colored at the surface, and either red, reddish brown, or yellow below. This has been mapped as two soils, the Georgeville silt loam in those areas having the red subsoil and the Alamance silt loam where the prevailing color of the subsoil is yellow.

The soils derived from the weathering of intrusive dikes of volcanic rocks belong in the Iredell series, two types being represented in the county, the sandy loam and clay loam.

The second of the major soil divisions is a comparatively small area in the southeastern corner of the county occupied by soils of an entirely different character and formation than those already mentioned. This is the Coastal Plain section of the county. The soils here are derived from a deposit of old marine sediments of a coarse sandy nature. The Norfolk coarse sand and Norfolk coarse sandy loam are both developed here.

The third general division includes a small area of alluvial soil material along the narrow stream bottoms, consisting of the wash from the uplands of the Piedmont and Coastal Plain materials. The Congaree silt loam and Meadow include all such alluvial areas.

Fourteen soil types, besides Rough gullied land and Meadow, were mapped in the county. These are classified in three series and six miscellaneous types. The following table gives the area of the several types and the proportion of the county which each type covers:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Rough gullied land [1]	90,560	18.7	Cecil sandy loam	19,776	4.1
Cecil coarse sandy loam	57,792	11.9	Norfolk coarse sandy loam	11,840	2.4
Cecil clay loam	54,272	11.2	Norfolk coarse sand	9,152	1.9
Cecil fine sandy loam	54,272	11.2	Alamance silt loam	5,824	1.2
Meadow	46,656	9.6	Congaree silt loam	3,264	.7
Iredell sandy loam	39,168	8.1	Cecil gravelly loam	1,280	.3
Georgeville silt loam	35,584	7.4	Cecil sand	896	.2
Appling sandy loam	28,480	5.9			
Iredell clay loam	25,024	5.2	Total	483,840	

[1] Consists mainly of Iredell, Cecil, and Durham material.

CECIL GRAVELLY LOAM.

The surface soil of the Cecil gravelly loam consists of a reddish-brown to light-brown sandy loam 5 or 6 inches deep, carrying varying quantities of rounded quartz gravel, ranging in size from one-fourth inch to 2 inches in diameter. The gravel often occurs in such large quantities as to make the soil very stony, droughty, and difficult to till. The subsoil, to a depth of 3 feet or more, varies from a reddish-brown heavy loam to a heavy red clay, containing in the upper portion some quartz gravel and coarse sand.

This type occupies rough, broken land along the Wateree River in the extreme eastern part of the county. It is evidently of residual origin and formed by the decaying of granitic rocks, with a deposit of waterworn gravel at the surface. The present tree growth consists of pine and hardwood in about equal proportions.

Areas of the Cecil gravelly loam now under cultivation produce good crops of cotton and corn, the two money crops of the area. Cotton will yield as much as 1 bale per acre, the average being from one-third to one-half bale. Corn gives on an average a yield of 15 bushels, although as much as 40 to 50 bushels have been reported in the most favorable seasons. By careful management, including rotation of crops, this soil could easily be made to produce excellent yields of all the farm crops adapted to the region, including many of the fruits.

The greater part of the Cecil gravelly loam is now tenanted by negroes. Where not held for purposes other than agriculture the type is valued at $20 an acre.

CECIL COARSE SANDY LOAM.

The surface soil of the Cecil coarse sandy loam is a gray to light-brown coarse sandy loam, varying in depth from 3 to 6 incnes. A large part of the sand content is medium to fine in texture, though a considerable proportion of it ranges from coarse sand to fine gravel in size. The sand grains are mainly angular fragments of quartz. The surface has a gray appearance from the presence of these coarse sand particles and after a rain consists of nothing else. Immediately below the surface lies the finer brownish material, which is brought up in cultivation, and a newly broken field loses the gray color. The subsoil consists of a compact red clay of variable depth, carrying a smaller quantity of coarse material. This subsoil may be entirely lacking where the underlying rock is close to the surface or it may extend to a depth of many feet before it finally grades into the disintegrated bedrock.

The structure of this soil is rather loose and open at the surface, owing to the large percentage of coarse material present, but it

becomes more compact below until the deep subsoil or disintegrated rock is reached. The deeper subsoil is quite open in character.

Cultivation of the Cecil coarse sandy loam is not difficult. The material does not clod, and the rock fragments, though plentiful, are not found in quantities sufficient to hinder plowing or other tillage operations.

A large body of this type is found southwest of Winnsboro, extending to Little River, broken by small, irregular-shaped areas of other soils. The type also occurs quite extensively northeast of Winnsboro in the vicinity of Flint Hill and Bucklick. Other small areas are found throughout the county. The topography in general is undulating to rolling, but some steep, hilly areas exist. It insures good natural drainage.

The Cecil coarse sandy loam is derived from the weathering and disintegration of a coarse-grained granite. The structure of the parent rock is being preserved in the undisturbed subsoil, and quartz veins are often seen in deep cuts, extending through the red clay. Similar quartz veins occur in the unweathered granites of the region occupied by this soil. Quartz fragments of varying size and irregular, angular shape, derived from these veins, are often found scattered over the surface of the soil.

Originally the Cecil coarse sandy loam was forested largely with hardwoods, the various species of oak predominating. At present uncultivated areas support mixed growths of field pine and oak. Such areas are nearly always confined to the sandier, steeper, and rougher portions of the type.

The chief crops grown on the Cecil coarse sandy loam are cotton and corn. A small acreage is devoted to oats. Vegetables, including sweet potatoes and sometimes a small patch of Irish potatoes, are produced solely for home use. The yield of cotton varies from one-fourth bale on the poorly farmed areas to 1 bale on the better lands, averaging about one-half bale per acre. Corn gives a yield of 10 to 40 bushels per acre, the larger yields being from fields in which cowpeas have been grown previously. Cowpeas furnish valuable forage if cut green, or they may be allowed to mature and be harvested for seed, which brings a good price. Oats yield from 10 to 25 bushels per acre and are a desirable crop for use in rotation. They are sown in the fall and, besides their direct value as a crop, give needed protection to the fields during the winter. The yields of all these crops depend upon the condition of the soil, the care and cultivation given, and the quantity of fertilizer used.

For the improvement of the areas of this type the first requisite is the addition of organic matter. Deeper, better, and more thorough plowing and subsequent cultivation are also necessary. Much commercial fertilizer is now used, dependence being placed upon it

rather than upon the proper management of the soil. Cover crops of crimson clover, vetch, etc., should be grown and plowed under as green manure. Besides the organic matter thus supplied, nitrogen taken from the air by these plants will be added to the soil, and the fertilizer used may contain less of this ingredient. The organic matter would enable the soil to retain more moisture for the growing crops and at the same time retard washing. A regular rotation of crops should be practiced. The rougher areas not to be reforested should be planted to Bermuda grass, and used for grazing cattle and sheep. Some income could thus be obtained from areas now producing none, and if the animals were housed during the winter larger quantities of stable manure for the cultivated crops would be available. In this way also the expenditure for commercial fertilizers could be reduced. A mixture of cotton-seed meal, acid phosphate, and potash in the ratio of about 2:1:1 has been profitably used on this kind of land for cotton, corn, and oats in acreage applications ranging from about 400 to 700 pounds.

The general agricultural conditions prevailing over the Cecil coarse sandy loam are good, especially where the owner is farming the land himself. The value of land of this type varies considerably. Near Winnsboro it is held, when in good condition, at $50 to $100 an acre. In the more remote sections and where the farm is not so well improved or the fields are in poor condition from $20 to $30 an acre is a fair valuation.

CECIL SANDY LOAM.

The surface soil of the Cecil sandy loam consists of a medium sandy loam from 4 to 7 inches deep, or a loamy sand from 6 to 12 inches in depth. The shallower areas are, as a rule, brownish in color, while the lighter and deeper areas are of a light-gray color. The subsoil is a red clay, carrying considerable quantities of medium to fine sand. This subsoil is usually compact, somewhat impervious to water, and extends to some depth. It is underlain by either the solid, unweathered country rock or a mass of the disintegrated rock of the same character, in turn underlain by bedrock. In places the rock is found near the surface, but as a rule it is deeply covered with the weathered product. The clay subsoil is uniform, except as quartz veins extend through it. These veins account for the scattered fragments of quartz found locally on the surface of the type. They are rarely so abundant as to interfere with cultivation.

A phase of the type is found in most areas where washing has removed the sandy surface soil. These areas, or "gall spots," are redder in color and of a heavier texture. The soil is easily cul-

tivated, clodding seldom occurs, and no trouble is experienced in securing a seed bed of good tilth.

The Cecil sandy loam occurs quite extensively in practically all parts of the county. It usually occupies the crests of the ridges and interstream areas. It has generally an undulating to rolling topography, which insures good drainage. These topographic features, however, make the type especially susceptible to washing and gullying. The character of the subsoil is such that internal drainage is not usually excessive, though crops may suffer from a lack of moisture during long periods of drought.

The type is a residual soil derived from granite and gneiss. These rocks are in general weathered deeply, as is shown in erosions and road cuts, though they sometimes outcrop. Like the coarse sandy loam of the same series, the assorting power of running water has developed the sandier mantle of the surface soil by removing a portion of the finer soil-forming materials.

The native forest growth on this type was composed of various species of oak, hickory, and other hardwoods. Practically all of this has been removed. The second growth now consists of a comparatively young growth of oaks, with some shortleaf pine on those areas which have not been put under cultivation and old-field pine on the areas that have been cleared, cultivated, and then abandoned.

The Cecil sandy loam is well adapted to cotton, corn, sweet potatoes, Irish potatoes, cowpeas, crimson clover, vetch, sorghum, etc. Oats and some of the grasses also are fairly well adapted to it. Cotton and corn at present occupy the larger proportion of the type. Well-prepared fields with the soil in good condition give yields of a bale or more of cotton, but the average yield will not exceed one-half bale per acre. Corn on many fields yields as high as 50 and 60 bushels per acre. The average, however, is probably not over 20 to 25 bushels per acre. Oats will yield from 15 to 30 bushels or more per acre. Cowpeas grown alone yield from 1 to 2 tons of hay per acre, but they are usually planted with the corn. Sown in this way they supply a quantity of forage of high feeding value or from 6 to 12 bushels of seed peas. Sweet potatoes, garden vegetables, and sorghum, which is used to make sirup, are grown only for home consumption. These crops give yields sufficiently large to warrant their production for market. Commercial fertilizers are extensively used in connection with cotton and often for the other crops. Under the present system of farming, crop yields depend largely upon its use.

The Cecil sandy loam is in need of organic matter, which can be supplied most cheaply by growing legumes such as crimson clover, vetch, bur clover, etc. Rye, oats, and barley are crops that can be turned under to advantage. These should be grown as cover crops during the winter when the soil is not being used for a money crop,

but is usually left bare and exposed to washing and gullying. The continuous growing of crops requiring clean culture is not recommended. No permanent improvement of the soil can be expected while this system of cropping is followed, even with the use of mineral fertilizers. A variety of crops should be grown in rotation, with cotton not oftener than every third year. All areas not in cultivation or protected by terracing and contour cultivation should be reforested or sown to Bermuda grass for pasturage.

Mixtures of cottonseed meal, acid phosphate, and kainit or other potash salts give good results on this land in moderate to liberal applications, especially where the soil is well supplied with organic matter.

The agricultural conditions on the Cecil sandy loam are good. Much of its area is under cultivation and on the whole giving good returns. Land values range from $24 to $50 an acre, depending upon improvements and location.

CECIL FINE SANDY LOAM.

The soil of the Cecil fine sandy loam is a light-brown to gray sandy loam of fine texture, about 6 inches deep. The subsoil consists of a compact red clay, usually extending to a depth of many feet before the bedrock is encountered. Local areas are heavier at the surface, as a result of the exposure of the clay subsoil by washing. Quartz fragments are found scattered over the surface in many areas of small extent. While the soil is mellow and not difficult to put in good tilth, some care is necessary in plowing or cultivating to see that the moisture content is not too high or clodding may take place.

The type occurs most extensively along the Chester County line east and west of Blackstock and in the vicinity of Ridgway, with small areas in other parts of the county. The topography is undulating to rolling, giving good drainage. In places the slopes are steep enough to cause serious damage from washing. This soil is derived from the weathering of fine-grained granites and gneisses.

The original timber growth consisted of oak, hickory, and other hardwoods. The second growth consists principally of old-field pine, though the hardwoods predominate where the soil has never been under cultivation.

The Cecil fine sandy loam is especially adapted to cotton, corn, small grains, and grasses. Like all other soils of the county, its chief utilization is in the production of corn and cotton. The former will yield with proper cultivation from 25 to 50 bushels per acre or more, although the average yield is much less. Cotton is usually given better care and is more heavily fertilized than corn. Some farmers secure yields of a bale or slightly more per acre, but the average ranges from one-third to one-half bale per acre. Oats yield

from 10 to 30 bushels per acre. Cowpeas and grasses for hay yield ordinarily about 1 ton per acre. More thorough tillage and more careful fertilization are necessary for the improvement of this soil. Plowing should be done with a 2-horse turning plow, as with such a soil efficient work of this kind can not be done by the light 1-horse plows commonly used. The compact, heavy subsoil makes it impracticable to turn and stir the soil adequately with small implements and light draft. Until a depth of 8 to 10 inches is reached some of this subsoil should be brought to the surface with each plowing, where it can be incorporated with the surface soil. For this purpose a turning plow is necessary. Sod crops and legumes should be grown to a much larger extent than at present. Rotation of these crops with cotton and corn should be practiced. The soil is a good one for dairying, and this type of farming should prove profitable. A pasture sod is not difficult to obtain, and good crops of hay and green forage can be grown.

Cottonseed meal, acid phosphate, and kainit, mixed according to the formula 8–3–4, give good results with cotton, corn, oats, and peanuts. Other ingredients may be used, but these have been proved of value in various parts of the Piedmont.

The agricultural conditions of the type are good. Land values are relatively high, though not excessive, for this is an excellent soil. It is one that may be greatly improved by proper methods of management, and when once in a high productive state can be readily maintained in that condition.

CECIL CLAY LOAM.

The Cecil clay loam consists of a dark-brown to reddish-brown or red heavy loam to clay loam, varying in depth from 5 to 9 inches, overlying a subsoil of compact dark-red heavy clay. The soil always contains some sand, and in many places enough in local areas to make it a sandy loam. On the other hand, the whole mantle of soil has been removed from slopes by washing, leaving the clay subsoil exposed. Both of these phases are of too small extent and too irregular in occurrence to be separated from the typical material. Fragments of quartz of varying size and angular shapes are scattered over the surface in many areas. The subsoil is generally of considerable depth. It is free from rock fragments and uniform, except for the presence of quartz veins extending through it. In its lower depths the subsoil passes gradually into the partially weathered and disintegrated parent rock. This type is the "red land" of the county.

The cultivation of the Cecil clay loam is attended with some difficulty. The soil is heavy and clods if it is plowed and cultivated in a moist condition. A favorable tilth, however, can be secured if the soil is handled at the proper time; that is, just after the soil ceases

to be sticky, though more labor is required than with the sandy types of the series. No attempt should be made to plow this soil except with a heavy turning plow, as it can not be properly prepared by the use of the ordinary light 1-horse plow generally used.

Areas of the Cecil clay loam are found in nearly all parts of the county. It is most typically and extensively developed in the vicinity of Winnsboro, north of Simpson, and between Little River and Broad River, in the western part of the county. The areas are of two distinct topographic kinds. The larger and more typical areas have a rolling to undulating surface. They are remnants of a former plateau and represent the full section of the weathered rock material undissected by erosion. Less representative and irregular shaped areas occupy hillside positions. These are usually washed and gullied badly and of little value for agriculture. The drainage of this soil is somewhat deficient, owing to its compact structure and heavy clay texture. The more level areas would be benefited by underdrainage.

The Cecil clay loam is derived from the deep weathering of fine-grained granites and gneisses. The rougher hillside areas are the result of the removal of the sandy soil covering and really represent the subsoil of the sandy loam types.

The native growth of timber was largely hardwood, various species of oak predominating. At present most of the upland areas are cleared and cultivated, but the eroded hillsides are either bare of all vegetation or grown up in field pine. Some Bermuda grass is found in these old fields. Its cultivation should be encouraged.

The Cecil clay loam is probably the best soil in the county. It is well adapted to the common crops of the region, cotton and corn, and to wheat, oats, and various species of grasses and legumes. The yields secured from fields of this soil are almost always good. Cotton will yield from one-half bale to 2 bales per acre with an average of about two-thirds to three-fourths bale. Corn yields from 20 to 50 bushels and oats from 15 to 40 bushels per acre. Cowpeas and grasses will cut from 1 to 2 tons of hay per acre.

The system of farming practiced on this clay soil is identical with that in use on the sandy loams and the same crops are grown. A system of cropping should be introduced which would prevent the alternate production of corn and cotton continuously by introducing in the rotation a grass crop to be cut for hay and a winter grain crop, either oats or wheat. This, with a winter cover crop of crimson clover or vetch following either the corn or cotton or both, and cowpeas with the corn crop, would not only improve the soil permanently and save a part of the present expenditure for fertilizers, but would at the same time prevent much damage resulting from washing. Deeper plowing and even subsoiling should also be em-

ployed. This would provide a deeper feeding zone for the crops and increase yields considerably. In connection with the growing of the legumes, clover, vetch, cowpeas, and efforts to improve the tilth of the soil, the use of lime would be beneficial. All of the rough and gullied areas should be either left in forest or sowed to Bermuda grass and used for pastures. This would give an income from areas now worthless, and afford the opportunity to obtain more stable manure for use upon the fields producing the money crops. Such areas should never be used for cultivated crops.

It is believed that the percentage of potash in the fertilizer mixtures used on this land is needlessly high. A number of the better farmers have found this to be so. One farmer has had prepared a "red land" fertilizer containing very little potash. Mixtures analyzing 10–3–2 or 10–3 would probably give more profitable returns than those running high in potash.

The prevailing agricultural conditions over the better areas of the Cecil clay loam are good. If properly managed it produces the best and largest crops of any soil in the county, and the more level areas are generally in a good state of cultivation. In value this soil type varies from an almost nominal sum for the washed and gullied areas to $100 an acre for tracts in a good state of cultivation and near the towns or shipping points.

CECIL SAND.

The Cecil sand consists of a light-gray sand at the surface with a yellowish sand beneath. The depth of this sandy material varies from 24 inches to about 3 feet. It is in turn underlain by the red Cecil clay subsoil material. The texture is comparatively uniform, being medium to fine.

The Cecil sand is of small extent. It occurs principally west of Rion, and is derived from the weathering of country rock and local wash. Some of it is under cultivation, being included in fields in the main composed of other Cecil types and planted to the same crops, principally cotton and corn. The yields are light, unless heavy fertilization is given. Even then the yields are often very poor, on account of lack of moisture.

IREDELL SANDY LOAM.

The surface soil of the Iredell sandy loam consists of a medium sandy loam of a grayish to dingy-brown color, with a depth of 5 to 10 inches. It is usually rather loose and incoherent at the surface, becoming somewhat sticky as the subsoil is approached. The subsoil is a sticky, plastic, waxy clay, known locally as "pipe clay," varying in depth from a few inches to several feet. It is generally of a dingy yellow or yellowish-green color. It has a peculiar, dense

structure, which practically prevents the movement of soil moisture and interferes greatly with cultivation. Its deeper portion consists of partially decomposed rock. In many places the surface soil itself rests upon the bedrock, and fragments of rock strew the surface of many areas. Owing to the dense puttylike subsoil, cultivation is rather difficult, except where there is a good soil depth over the clay. Along slopes some areas have a reddish soil, representing colluvial accumulation from the Cecil soils.

The Iredell sandy loam is quite extensively developed. It is found in almost all parts of the county, but is most prominent between Salem Church and Albion, east of Winnsboro, along both sides of Little Wateree Creek, northeast of Ridgeway on Dutchmans Creek, north of Whiteoak on the headwaters of Big Wateree Creek, and in the vicinity of Jenkinsville, Dawkins, and Buckhead. Its topographic features vary from rolling to hilly. The drainage is inadequate and crops consequently suffer. This is due chiefly to the impervious clay subsoil. Artificial drainage is necessary for the successful use of most areas of the type.

The Iredell sandy loam is the result of the weathering of rocks which occur in dikes throughout the county. Hornblende schist enters largely into its composition. The native timber growth consists of blackjack oak to such an extent that this soil, with its companion type, the Iredell clay loam, is known locally as "blackjack land." It supports also a stunted and usually sparse growth of old-field pine.

The Iredell sandy loam is better adapted to the production of the small grains, oats and wheat, and forage crops than to corn and cotton, though it is used for the two staples last mentioned. Poor drainage conditions and lack of proper care during the growing season tend to keep the yields low. Cotton does not average much more than one-fourth bale and corn not more than 10 bushels per acre. A very fair crop of cotton was secured during the dry season of 1911. This soil should be more largely devoted to grain and forage crops and to pasturage. Wherever cultivated better drainage should be established and more efficient methods employed.

Cotton frequently suffers from "rust" and corn from "frenching" on this land. Potash salts seem to be the remedy for these diseases. An acreage application of about 150 to 300 pounds of kainit is effective. The soil is rather cold where the dense clay comes near the surface. On such areas acid phosphate hastens the maturing of the crop.

IREDELL CLAY LOAM.

The Iredell clay loam consists of a grayish to dark-gray or almost black heavy sandy loam to clay loam of a depth varying from a thin veneer to 7 inches, overlying a sticky, impervious clay, which ex-

tends to a depth of about 30 inches. The clay is waxy and usually brownish yellow or greenish yellow in color. On exposure to the sun it turns brown and cracks badly. Locally it is known as "pipe clay." Below 30 inches the disintegrated parent rock is encountered.

Iron concretions are found in the surface soil in occasional small areas. There are also small areas of a rather coarse sand. The latter are marked by numerous gullies and were too small to map. Areas where the surface soil has an average depth of 6 inches are fairly easy to cultivate, the difficulty depending upon the depth to which the subsoil is turned in plowing.

This soil is not confined to any one locality, but is found in areas of irregular outline and varying extent in all parts of the county. Some of the largest occur along Dutchmans and Rochelle Creeks, between Little and Broad Rivers in the southwestern part of the county, between Gaydens and Big Wateree Creeks, and along the gentler lower slopes north of Big Wateree Creek. Many other small areas occur especially in the broken country along the Broad River.

Although the surface of this type is on the whole gently rolling to undulating, it is often found on the steeper slopes and hillsides, where its occurrence is mainly due to the removal through erosion of the greater part of a former sandy covering.

The Iredell clay loam is a residual soil derived from the weathering and disintegration of a number of rocks, among which diorite and diabase are conspicuous. These rocks, which occur as intrusive dikes, have not weathered deeply, owing to the protection afforded by the impervious weathered product.

Blackjack oak is the characteristic forest growth, and the land is locally known as "blackjack land." A few black and red oaks, some cedar, and an occasional sweet gum and field pine comprise the other important tree species.

The Iredell clay loam, although at one time extensively cultivated, as is shown by the ridged surface, is now but little used for farming. This abandonment is probably due to the difficulty of properly handling it and the consequent low yields. The crops are chiefly cotton and corn. Corn yields as high as 25 bushels per acre with good cultivation, but the average yield is much lower. Cotton in the best seasons yields from one-third to two-thirds bale per acre, the average being less than one-third bale.

Oats, wheat, and other of the small grains are the crops to which this soil is especially adapted. More cowpeas and other legumes should be grown and a systematic rotation of crops practiced. In fertilizing kainit has been found to be beneficial in preventing the "frenching" of corn and rust in cotton. It is likely that thorough drainage would effect the same relief. Acid phosphate is needed in moderate applications. The unfavorable physical and chemical con-

ditions of this soil, which are due to its impervious subsoil, could be improved by heavy applications of lime, which promote granulation, giving a more open structure, and correct the usual acidity of the type. As yet the advantages of liming have been entirely overlooked by a large number of the farmers.

On account of the difficulty in its management and its remoteness, this type commands a rather low price as compared with many of the other soils of the county. Prices range from $3 to $10 an acre. The type of agriculture prevailing over most of its area is poor but capable of improvement.

NORFOLK COARSE SAND.

The soil of the Norfolk coarse sand, to an average depth of 8 inches, is a light-gray to yellowish-gray coarse sand. In forested areas it is slightly darker, owing to the admixture of more organic matter. It is underlain by a yellowish-gray to yellow coarse sand, which usually has a lighter texture at lower depths. The deposits of this material have been removed more or less by erosion, leaving it shallow in many places. It is often not more than 3 to 5 feet deep, at which depth there is a gradual change into the red and yellow clay representing residual Piedmont material. The soil-forming material consists largely of subangular quartz grains, varying in size from medium or coarse sand to fine gravel. The occurrence of fine gravel with a high percentage of fine sand and silt often gives small areas of surface soil approaching a gravelly loam. Other areas of small extent are more nearly a medium than a coarse sand in texture. Such areas were noted especially along the Richland County line south of Blythewood.

This soil occurs on the higher ridges and knolls in the southeastern part of the county and represents remnants of the coarser materials of an old marine sediment. The Norfolk coarse sand is a Coastal Plain soil, although here its topographic features are more like those of the Piedmont Plateau soils. It occurs on the higher knolls and interstream areas, with Piedmont soils on the lower slopes. It has been left in this position, where erosion has been less active, and removed from the lower-lying areas. It is, however, rolling and badly eroded near the slopes and stream courses.

The Norfolk coarse sand supports a scanty growth of pines, among which the longleaf pine is conspicuous, with some scrub oak. Broom sedge and wire grass are characteristic plants of smaller growth.

The type is the most open and thoroughly drained soil of the county. It gives small yields, especially on the lighter areas, as all crops suffer from drought during seasons of light precipitation. The principal crops are cotton and corn, with some sorghum. The

cotton yield does not average more than one-third bale per acre, except on the best-managed fields plentifully supplied with organic matter. Corn averages about 8 bushels per acre, and rarely exceeds 20 bushels per acre even in favorable years. Sorghum does well, especially in the lower-lying areas. Owing to its open structure and good aeration, the Norfolk coarse sand is well adapted to the production of truck crops, such as strawberries, cantaloupes, watermelons, peas, beans, and early Irish potatoes. These crops would give good yields with care and cultivation, and pay much better than corn and cotton, for which the soil is not suited. The soil is also well suited to peaches.

The Norfolk coarse sand is deficient in organic matter, a constituent upon which its productive capacity depends to a large extent. This can be supplied in part by a good rotation with crops like cowpeas, velvet beans, crimson clover, and vetch, the growth to be plowed under. Applications of barnyard manure would greatly benefit this soil, but the supply is inadequate. With a good supply of organic matter in the soil the commercial fertilizers applied yearly will have a more beneficial effect. Organic matter is also necessary to assist the soil in retaining moisture for the growing crops. Frequent and thorough shallow cultivation should be practiced to prevent the loss of moisture through evaporation.

Liberal additions of complete fertilizer mixtures will be necessary for good yields of any crop on this soil. Cottonseed meal and kainit with a little acid phosphate give good results.

The condition of agriculture over areas of the Norfolk coarse sand is fair to good, though capable of much improvement. Much of the land is held at a nominal price. Its development along the special lines indicated would greatly enhance its productiveness and value.

NORFOLK COARSE SANDY LOAM.

The surface soil of the Norfolk coarse sandy loam consists of a light-gray to yellowish-gray loamy coarse sand to light coarse sandy loam, containing considerable quantities of very coarse sand and fine gravel to a depth of 8 to 14 inches. In places there is a sufficient quantity of medium and fine sand to justify its classification as a sandy loam, but such areas are of small extent and irregular occurrence and no attempt was made to separate them. Other areas show a high percentage of loamy material with varying qualities of quartz gravel.

The subsoil of this type in the first few inches contains a large quantity of sand and fine gravel, and varies in color from pale red to grayish yellow. Below this the typical Norfolk subsoil prevails: a bright yellow friable sandy clay. On the eroded hillsides and slopes this soil grades gradually from the yellow friable sandy clay

into a rather heavy reddish-yellow to red sandy clay, which in turn passes into the characteristic clay of the Piedmont soils. Such areas, had they been extensive, would have been mapped as other types—members of the Bradley or Chesterfield series.[1]

The type, especially in the deeper areas, is of an extremely loose structure, and in seasons of little rainfall produces poor yields of all crops.

The Norfolk coarse sandy loam occurs in strips and irregular-shaped areas along the ridges and slopes of the interstream areas. Like its companion type, the Norfolk coarse sand, it often lies above the Piedmont soils. It is confined entirely to the southeastern part of the county.

It occupies the level upland areas, becoming gently rolling to rolling in places. Its loose and incoherent structure and coarse texture insure good drainage. It is derived from the weathering of a mantle of sands and clays of Coastal Plain sedimentary materials and forms part of the section commonly known as the "Sand Hills." The original timber growth was largely longleaf yellow pine. At present much of the type supports a growth of scrub oak, shortleaf and longleaf pine, dogwood, and sweet gum.

A considerable proportion of the Norfolk coarse sandy loam is now under cultivation. The farming methods are as a rule poor. The land can, however, be made to produce good yields of truck crops and fair yields of the general farm crops. Cotton and corn, for which it is not particularly adapted, are the leading crops. Cotton yields about one-fourth to one-third bale and corn from 5 to 15 bushels per acre. These yields can be increased by the use of larger quantities of fertilzer. An acreage application of a mixture of 400 pounds of cottonseed meal, 200 pounds of kainit, and 100 pounds of acid phosphate would give good results with either cotton or corn.

Lighter areas of the Norfolk coarse sandy loam are particularly adapted to the production of truck crops, such as peas, beans, melons, early Irish potatoes, and strawberries. Peaches and scruppernong grapes should also do well. This soil should be devoted to these crops rather than to the general farm crops now grown.

As in the case of most of the soils of Fairfield County, the Norfolk coarse sandy loam is deficient in organic matter. With addition of this material more profit will be derived from the use of the commercial fertilizers, more moisture will be retained by the soil for crop use, and the tilth of the soil will be greatly improved. Of equal importance with increasing the organic content is the practice of a systematic rotation of crops. Legumes, such as vetch and crimson clover, should be used in such a rotation to serve as green manure.

[1] See Bul. 96, Bureau of Soils.

In this way this soil may be made much more productive than it is at present.

Near the railroad the Norfolk coarse sandy loam commands a relatively high price. In more remote sections values range from $10 to $25 an acre.

ROUGH GULLIED LAND.[1]

The Rough gullied land comprises a variety of soils, which are so mixed, so badly washed and gullied, and so rough in topography that it was impracticable to make any satisfactory separation into distinct types. The classification includes chiefly materials which range from coarse sandy loams and sandy loams through raw freshly eroded clay to partially decomposed and disintegrated rock. These soils grade from one to another in such a way that definite boundaries can not be easily located. There are also numerous irregular patches of partially decomposed granite, gneiss, and quartzitic and hornblendic schists, representing areas where erosion has removed the former covering of soil material. Rock fragments, especially of quartz and trap rock, are numerous in many places, particularly on the steeper slopes.

Extensive areas of this character are found throughout the northern half of the county, the largest lying north of Dawkins, in the vicinity of Luke, between Albion and Whiteoak, east of Woodward, east of Adger, and south of Gaydens. This soil has a rougher topography than any other of the county. The surface is rolling to hilly and rough. The areas follow the stream courses, but occasionally extend over the ridge crests. The slopes along the stream courses and narrow bottoms are badly washed and gullied. The surface features are generally so uneven and broken as to preclude the use of the land for farming.

The Rough gullied land is derived from the disintegration and decay of granites, gneisses, and schistose rocks, including hornblendic to quartzitic schists, the spots of Iredell soils being formed in the same manner from the dioritic material of intrusive dikes. Excessive erosion has to a large extent removed the decomposed parent rock, leaving the coarser particles of the disintegrated product.

In its natural state the land is covered with forests of hardwoods, largely oak and shortleaf pine. Most of this has been cut and the present growth is largely stunted shortleaf pine and scrubby oaks. A considerable proportion of the type formerly cultivated has reverted to forest. Excessive erosion and poor management when under cultivation has caused the abandonment of much of this land. Erosion is advancing at a rapid rate on cleared areas, and will continue unless a different use is made of the land.

[1] Consists mainly of Iredell, Cecil, and Durham material.

Only on the best of the smoother areas of the Rough gullied land should cultivation be attempted. Most of it is better adapted to forestry and grazing than to the production of cultivated crops. Tracts of this soil could be profitably used in conjunction with other types for grazing purposes. A sod of Bermuda grass or a good covering of forest trees would minimize, if not prevent, further washing and gullying, and insure some income from large areas now nonproductive.

Where the topography is favorable for cultivation attempts should be made to increase the organic matter content of the soil, not only to secure better crops, but for the binding effect such material has on the soil particles. Terracing and contour cultivation are absolutely necessary. The terraces should be strengthened by a Bermuda sod.

Over a large proportion of the Rough gullied land the type of agriculture is exceedingly poor. Where farmed at all it is occupied largely by negroes, and under their tenancy it is rapidly deteriorating. Owing to the naturally unfavorable conditions, augmented by those resulting through poor managemnt, the Rough gullied land is the least valuable soil in the county. Prices are nominal, with no demand for the land.

APPLING SANDY LOAM.

The typical Appling sandy loam consists of a gray to yellowish-gray sand to loamy sand, averaging about 10 inches in depth, underlain by a compact friable sandy clay, mottled or streaked with red, yellow, and gray. Some areas have a deep sandy surface soil; in others the soil is shallow. There is also a wide variation in the color of the subsoil from the red of the Cecil soils to the yellow of the Durham soils, but the mottling and streaking is characteristic. In fact, the type seems to be an intermediate soil between the Cecil and Durham. The soil often runs high in content of coarse grains of angular quartz.

The sandy character of the soil covering insures ease of cultivation, and no difficulty is experienced in the preparation of a good seed bed. Cultivation can be performed under a rather wide range of moisture conditions.

The Appling sandy loam is found north and northeast of Winnsboro, around Gaydens, south of Salem Church, and quite extensively in the northwestern corner of the county. It occupies usually the crests of ridges, but in places extends down the slopes to stream courses. The topography is undulating to rolling, and the drainage good. The type is residual, having been derived from granites and gneiss, probably more largely from the latter.

Much of the type is cleared and under cultivation, the principal crops being cotton, oats, and corn. These crops do well, the soil being well adapted to their production. In favorable years cotton will yield from one-half to 1 bale, corn from 25 to 50 bushels, and oats from 30 to 60 bushels per acre. Average yields are about one-half bale of cotton, 15 to 25 bushels of corn, and 40 bushels of oats per acre. Cowpeas are frequently planted in the corn, giving some forage and seed peas. The practice is a good one, tending to maintain the productiveness of the land through the addition of organic matter and nitrogen.

The Appling sandy loam should be more intensively farmed and a greater variety of crops produced. It is well adapted to the forage crops, such as cowpeas, crimson clover, and vetch. It is a good type for the production of Irish potatoes, sweet potatoes, and some of the heavy truck crops, cabbage, sweet corn, garden peas, tomatoes, peanuts, watermelons, cantaloupes, and cucumbers. The chief need of this soil type is more organic matter, which can be supplied by stable manure where available and the turning under of leguminous cover crops.

The general condition of the type is good. The fields are in better condition and more carefully farmed than is the rule in the county. The land usually commands a good price.

The following table shows the results of mechanical analyses of samples of soil and subsoil of the Appling sandy loam:

Mechanical analyses of Appling sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
241619	Soil.....	6.3	22.0	13.3	27.6	13.3	14.6	2.8
241620	Subsoil.....	1.4	8.9	6.8	16.9	7.9	22.9	35.0

GEORGEVILLE SILT LOAM.

The Georgeville silt loam consists of a light-yellow to gray or reddish-gray silt loam, from 3 to 8 inches in depth, overlying a pale-red to red silty clay, sometimes mottled with pink and brown. Erosion has been active over much of the type, leaving exposed the red clay subsoil in numerous "gall spots." Many small areas contain fragments of quartz and slate in the surface soil, but the quantity is not great enough to interfere with cultivation. Weathering in this soil has proceeded to great depth, the disintegrated slaty rock, which underlies it, being rarely seen even in the most eroded sections. Quartz veins extending through the subsoil have given, as a result

of their disintegration, some areas a rather sandy clay texture and loose structure.

The Georgeville silt loam is a residual soil, derived from the weathering of underlying fine-textured slaty rocks. The deep weathering of these rocks is accounted for by the altered character of the material composing them.

Areas of the type occur only in the southern and southeastern parts of the county. The topography varies from gently rolling to rolling, with a few small areas of broken surface along the larger streams. The areas of more rolling topography form stream divides east of Longtown. With but few exceptions, where the drainage is excessive, this soil has satisfactory drainage conditions.

The forest growth supported by the Georgeville silt loam is principally the longleaf yellow pine and hardwoods, the pine predominating. Among the hardwoods are found white, red, post, and black oak, with a scattering growth of hickory, dogwood, and persimmon. A large proportion of the type is now thickly forested with a second growth of young oaks and pines of both the shortleaf and longleaf varieties.

This soil is distinguished by a large majority of the farmers from the red (Cecil) soils in other parts of the county. It is equal to the other red soils in productiveness and is well adapted to the production of corn, oats, sorghum, grasses, and cotton. The ordinary yield of corn is between 15 and 20 bushels, but on the better cultivated areas 50 to 60 bushels per acre are often obtained. Cotton averages between one-third and one-half bale, though as much as 1 bale per acre is obtained by the best farmers. Oats yield from 10 to 30 bushels per acre. Sorghum does fairly well on the more level areas.

Organic matter is needed to improve the structure of this type. This can be supplied by growing winter cover crops of rye, vetch, and crimson clover and using cowpeas and velvet beans more extensively between the rows of cotton and corn, or better, as separate crops. Some of these should be turned under entire, but where this does not seem advisable, the roots and stubble alone will supply much organic material. Of course all available stable manure will be supplied to the fields. Lime has been used on this soil in other sections with good results and is especially beneficial in the growing of the legumes. Fertilizers relatively high in phosphoric acid have given the best results on this soil, especially where corn and cotton are the crops.

The agricultural conditions of the section of the county dominated by this soil are fairly good, but capable of much improvement. The price of land varies with proximity to railway facilities, its condition, and improvements in the way of buildings. It sells at prices ranging from $10 to $30 an acre.

CONGAREE SILT LOAM.

The Congaree silt loam consists of a chocolate-brown to light-brown or yellowish silt loam, from 10 to 12 inches deep, underlain usually by a gray to light-brown fine sandy loam.

This soil occurs throughout the county in the bottoms mapped as Meadow, but some of these bottoms along the Wateree River and its smaller tributaries in the eastern part of the county are shown separately as the silt loam. The areas are of small extent. The type is derived from fine sediments deposited from overflow waters. The topography is flat and nearly level, which, together with the low position, makes the drainage of much of the type poor.

Practically none of the Congaree silt loam is under cultivation. It is naturally very productive, but is subject to overflow. Areas situated where damage from this source is small are admirably suited for corn, cotton, and the grasses. Forests of gum, willow, a few maple, sycamore, and other deciduous trees now cover the type.

The following table shows the results of the mechanical analyses of samples of the soil and subsoil of the Congaree silt loam:

Mechanical analyses of Congaree silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
241614	Soil	0.4	0.9	1.2	12.1	16.3	49.2	19.7
241615	Subsoil	.3	2.1	2.8	19.4	25.9	34.6	14.8

ALAMANCE SILT LOAM.

The Alamance silt loam consists of a gray compact silt loam, with a depth of 6 inches, underlain by a bright-yellow silty clay, extending to a depth of 36 inches. Many fragments of quarts and slate appear in the surface soil. Along some of the stream courses wash from associated types has modified somewhat the surface soil. In small areas throughout the type the subsoil is influenced by the decomposition of rocks forming the Iredell soils.

Areas of the Alamance silt loam occur throughout the southern and southeastern parts of the county, where they are associated with the Georgeville silt loam. The topography in general is slightly rolling to undulating, though sometimes nearly level areas are found. The surface features of many small areas along the creeks are typical.

The Alamance silt loam is derived from the weathering of fine-textured slaty rocks, carrying some iron. The native vegetation consists principally of second-growth pine of the shortleaf varieties, with some hardwoods, blackjack oak, chestnut oak, and a little hickory.

Cotton and corn are the leading crops. Cotton yields from one-fourth to three-fourths of a bale, the latter in good seasons from the best fields. Corn does fairly well, the yields ranging from 8 to 25 bushels per acre. In good seasons and on fields in a good state of cultivation the yield may run as high as 35 to 40 bushels per acre. Oats are grown to some extent and give fair returns. This soil is best suited to growing the small grains, potatoes, cotton, corn, forage crops, and cane.

In many of the areas where the soil is stiff and compact the surface is inclined to bake and crack, causing an excessive loss of moisture. Such areas are usually deficient in organic matter and difficult to cultivate. They can be improved by rotation of crops, the use of stable manure, and the growing of legumes. The latter should be turned under as green manure.

Land of this type of soil brings a slightly lower price than the Georgeville silt loam. Improved farms may be had for $7.50 to $25 an acre.

MEADOW.

The areas mapped as Meadow comprise a variety of Congaree soil materials so intimately associated as to preclude their separation into soil types. The texture varies from a coarse sand to a heavy silty clay. The areas occur only in the stream bottoms, but are scattered throughout the county. They usually lie just above the stream level and are subject to overflow in time of high water.

Formerly the areas of Meadow were among the most productive soils of the county, but the wash from the uplands, where owing largely to poor management erosion has been severe, has covered the original soils (Congaree) with deposits of variable texture, largely sand, and made many of them worthless for cultivation.

The Meadow is usually covered with a growth of willow, ash, maple, and other trees requiring moist soil conditions. Practically none of the type is cultivated, and its only use at present is as pasture.

SUMMARY.

Fairfield County is located in the north-central part of South Carolina and has an area of 756 square miles, or 483,840 acres. Only 27 per cent of the available land of the county is under cultivation. The population is 29,442, of which three-fourths is negro.

The drainage of the county is into the Santee through the Broad and Congaree Rivers to the west and the Catawba-Wateree River to the east.

The climate is mild, the summers being long and hot and the winters short, with few days of low temperature. The average growing season is 228 days. Rainfall is ample and evenly distributed.

Markets for products raised in the area are good and transportation facilities for much of the county are ample. Wagon roads are poor to fair.

Cotton is the chief crop of the county, with corn second. Other crops are unimportant in acreage and production. More attention should be given to the diversification of crops. Certainly those crops used on the farm, which are now purchased, should be produced in quantities sufficient to supply local needs.

The county lies partly within the Piedmont Plateau and partly within the Atlantic Coastal Plain. The soils are mainly residual in origin.

Fourteen distinct soil types were mapped in the area, exclusive of Rough gullied land and Meadow. These were grouped into three series and six miscellaneous types.

The Cecil group of soils is the largest, six types being recognized—the gravelly loam, coarse sandy loam, sandy loam, fine sandy loam, clay loam, and sand. The soils of this group are devoted chiefly to cotton and corn, although all of them are adapted to a wider range of crops.

Two types were recognized in the Iredell series—the sandy loam and clay loam. These types are poorly drained and better suited to forage, grain crops, and grazing than to corn and cotton.

Of the Norfolk series the coarse sand and coarse sandy loam are found in the area. These types are adapted to the production of small fruits and truck crops, such as strawberries, peas, beans, melons, and potatoes. Grapes and peaches can also be grown to advantage. These soils are open in structure and well drained.

The Appling sandy loam has some of the characteristics of the Cecil sandy loam and the Durham sandy loam. It is a good agricultural soil and well adapted to cotton, oats, and corn, but a wider range of crops should be grown upon it.

The Georgeville and Alamance silt loams are closely associated, the only difference being in the subsoil, that of the former being red and of the latter yellow.

The Congaree silt loam and Meadow are of small extent and unimportant from an agricultural standpoint.

All of the upland soils are more or less damaged by erosion, and fields once productive are now covered with old-field pine. Much of the land now idle could be seeded to Bermuda grass and used for pasture. Reforestation of many areas now unproductive is also suggested as a provision for future income from these lands.

Land values are relatively low, and there is good opportunity for the farmer who understands modern methods of agriculture.

[PUBLIC RESOLUTION—No. 9.]

JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, providing "for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, be amended by striking out all after the resolving clause and inserting in lieu thereof the following:

That there shall be printed ten thousand five hundred copies of the report on field operations of the Division of Soils, Department of Agriculture, of which one thousand five hundred copies shall be for the use of the Senate, three thousand copies for the use of the House of Representatives, and six thousand copies for the use of the Department of Agriculture: *Provided,* That in addition to the number of copies above provided for there shall be printed, as soon as the manuscript can be prepared, with the necessary maps and illustrations to accompany it, a report on each area surveyed, in the form of advance sheets, bound in paper covers, of which five hundred copies shall be for the use of each Senator from the State, two thousand copies for the use of each Representative for the congressional district or districts in which the survey is made, and one thousand copies for the use of the Department of Agriculture.

Approved, March 14, 1904.

[On July 1, 1931, the Division of Soils was reorganized as the Bureau of Soils.]

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U.S. DEPT OF AGRICULTURE
BUREAU OF SOILS
MILTON WHITNEY, CHIEF.
CURTIS F. MARBUT, IN CHARGE SOIL SURVEY

SOIL MAP

SOUTH CAROLINA
FAIRFIELD COUNTY SHEET

SOIL PROFILE
(3 feet deep)

- Cecil sand — S / C
- Cecil gravelly loam — Sl / C
- Cecil coarse sandy loam — Csl / C
- Cecil sandy loam — Sl / C
- Cecil fine sandy loam — Fsl / C
- Cecil clay loam — Cl / C
- Iredell sandy loam — Sl / C / Dr
- Iredell clay loam — Cl / C / Dr
- Norfolk coarse sand — S / S
- Norfolk coarse sandy loam — Lcs / Csc
- Appling sandy loam — Ls / Sc
- Georgeville silt loam — Sil / Sic
- Alamance silt loam — Sil / Sic
- Congaree silt loam — Sil / Fsl
- Rough gullied land (Consisting mainly of Iredell, Cecil, and Durham material) — Sl / C / Dr

LEGEND

S—Sand
C—Clay
Sl—Sandy loam
Csl—Coarse sandy loam
Fsl—Fine sandy loam
Cl—Clay loam
Dr—Decomposed rock
Lcs—Loamy coarse sand
Csc—Coarse sandy clay
Ls—Loamy sand
Sc—Sandy clay
Sil—Silt loam
Sic—Silty clay

LEGEND

- Cecil sand — Cs
- Cecil gravelly loam — Cg
- Cecil coarse sandy loam — Ccs
- Cecil sandy loam — Csl
- Cecil fine sandy loam — Cf
- Cecil clay loam — Ccl
- Iredell sandy loam — Is
- Iredell clay loam — Ic
- Norfolk coarse sand — Nc
- Norfolk coarse sandy loam — Nsl
- Appling sandy loam — Ap
- Georgeville silt loam — Gs
- Alamance silt loam — As
- Congaree silt loam — C
- Rough gullied land (Consisting mainly of Iredell, Cecil, and Durham material) — Rg
- Meadow — M
- Stony areas

Hugh H. Bennett, Inspector in charge Southern Division.
Soils surveyed by M. Earl Carr, F.S. Welsh,
C.A. Crabb, Risden T. Allen and W.C. Byers

Scale 1 inch = 1 mile
1 ½ 0 1 2 3 4 Miles

Allen & Co. Lith. Baltimore, Md.

Field Operations
Bureau of Soils
1911